FCC CFR47 PART 15 SUBPART C
CERTIFICATION
TEST REPORT

FOR

NOTE BOOK WITH 802.11b MINI PCI CARD AND BLUETOOTH MODEM

MODEL: ZGIS

FCC ID: HFSZGISWM3B2100BT

REPORT NUMBER: 03T1782-1

ISSUE DATE: Febuary 13, 2003

Prepared for
QUANTA COMPUTER INC.
NO. 188 WEN HWA 2ND ROAD.
KUEI SHAN HSIANG
TAIWAN, R.O.C.

Prepared by
COMPLIANCE CERTIFICATION SERVICES
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1. TEST RESULT CERTIFICATION

COMPANY NAME: **QUANTA COMPUTER INC.**
NO. 188, WEN HWA 2 ROAD, KUEI SHAN HSUIANG
TAO YUAN SHIEN, TAIWAN, R.O.C.

EUT DESCRIPTION: **NOTE BOOK WITH 802.11b MINI PCI CARD AND BLUETOOTH MODEM**

MODEL NAME: **ZGIS**

DATE TESTED: JANUARY 29, 2003 TO JANUARY 31, 2003

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 15 SUBPART C	NO NON-COMPLIANCE NOTED

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: This document reports conditions under which testing was conducted and results of tests performed. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document.

Approved & Released For CCS By:

MIKE HECKROTTE
CHIEF ENGINEER
COMPLIANCE CERTIFICATION SERVICES

Tested By:

CHIN PANG
EMC TECHNICIAN
COMPLIANCE CERTIFICATION SERVICES

2. EUT DESCRIPTION

The Mini PCI Type 3B Single Band 802.11b WLAN is an embedded 2.4GHz Wireless Local Area Network operating via a Mini-PCI interface. The Mini-PCI Type 3B form factor is designed for notebook computer systems where overall thickness must be kept to an absolute minimum. It is capable of a data rate of up to 11 Mbps at 2.4GHz. This unit provides a power output of 16.7 dBm with an antenna gain of –1.76 dBi.

The Bluetooth circuit of this module is compliant to Bluetooth 1.1 standard. With V.92 technology, the modem part can achieve internet connection rates up to 56 kbits/s with backward compatibility. The V.92 Feature include PCM Upstream, Modem On Hold, Quick Connection and V.44 Data compression. The Audio CODEC will be placed on the notebook and contact with Modem Codec by AC-Link Interface. The combo card complies with MDC Domestic form factor. This unit provides a power output of 3.8 dBm with an antenna gain of +1.36 dBi.

3. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4 and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055, 2.1057, and 15.407.

4. FACILITIES AND ACCREDITATION

4.1. FACILITIES AND EQUIPMENT

The open area test sites and conducted measurement facilities used to collect the radiated data are located at 561F Monterey Road, Morgan Hill, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.7, ANSI C63.4 and CISPR Publication 22.

All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

4.2. TABLE OF ACCREDITATIONS AND LISTINGS

Country	Agency	Scope of Accreditation	Logo
USA	FCC	3/10 meter Open Area Test Sites to perform FCC Part 15/18 measurements	1300
Japan	VCCI	CISPR 22 Two OATS and one conducted Site	R-1014, R-619, C-640
Norway	NEMKO	EN50081-1, EN50081-2, EN50082-1, EN50082-2, IEC61000-6-1, IEC61000-6-2, EN50083-2, EN50091-2, EN50130-4, EN55011, EN55013, EN55014-1, EN55104, EN55015, EN61547, EN55022, EN55024, EN61000-3-2, EN61000-3-3, EN60945, EN61326-1	ELA 117
Norway	NEMKO	EN60601-1-2 and IEC 60601-1-2, the Collateral Standards for Electro-Medical Products. MDD, 93/42/EEC, AIMD 90/385/EEC	ELA-171
Taiwan	BSMI	CNS 13438	SL2-IN-E-1012
Canada	Industry Canada	RSS210 Low Power Transmitter and Receiver	IC2324 A,B,C, and F

5. CALIBRATION AND UNCERTAINTY

5.1. MEASURING INSTRUMENT CALIBRATION

The measurement instruments utilized to perform the tests documented in this report have been calibrated in accordance with the manufacturer's recommendations, and are traceable to national standards.

5.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

Radiated Emission	
30MHz – 200 MHz	+/- 3.3dB
200MHz – 1000MHz	+4.5/-2.9dB
1000MHz – 2000MHz	+4.6/-2.2dB
Power Line Conducted Emission	
150kHz – 30MHz	+/-2.9

Any results falling within the above values are deemed to be marginal.

5.3. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST AND MEASUREMENT EQUIPMENT LIST				
Name of Equipment	Manufacturer	Model	Serial Number	Calibration Due Date
SA Display Section 1	HP	85662A	3026A19146	5/23/03
Quasi-Peak Adapter	HP	85650	2811A01335	5/23/03
Spectrum Analyzer	HP	8566B	2140A01296	5/23/03
Preamplifier	HP	8447D	2944A06550	8/22/03
Antenna, Biconical	EATON	94455-1	1197	3/30/03
Antenna, Log Periodic 200-1000	EMCO	3146	2120	3/30/03
Preamplifier (1 - 26.5GHz)	Miteq	NSP10023988	646456	4/26/03
Horn Antenna (1 - 18GHz)	EMCO	3115	6739	1/31/04
Horn Antenna (1 – 18GHz)	EMCO	3115	6717	1/31/04
High Pass Filter (4.57GHz)	FSY Microwave	FM-4570-9SS	003	N.C.R.
High Freq Amplifier	HP	8449B	NA	5/30/03
EMI Test Receiver	Rohde & Schwarz	ESHS20	827129/006	4/17/03
LISN	FCC	50/250-25-2	114	9/06/03
LISN Filter	SOLAR	8012-50-R-24-BNC	837990	9/06/03
Line Filter	LINDGREN	LMF-3489	00497	N.C.R

6. SETUP OF EQUIPMENT UNDER TEST

SUPPORT EQUIPMENT FOR DIGITAL DEVICE TESTING

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
Laptop	Quanta Computer	ZGIS	QCHCP025000020	N/A
AC Adapter	Delta Electronic	ADP-75FB	NA	N/A
Printer	HP	2225C	2930S52614	DS16XU2225

I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US115	Un-shielded	2 m	Integrated with AC Adapter, Bundled only for LC test
2	AC	1	US115	Un-Shielded	2m	Unbundle
3	Parallel	1	Printer	Unshielded	2m	bundled
4	Ethernet	1	RJ45	Un-Shielded	3m	Unbundled
5	Phone	1	RJ11	Unshielded	3m	Unbundled

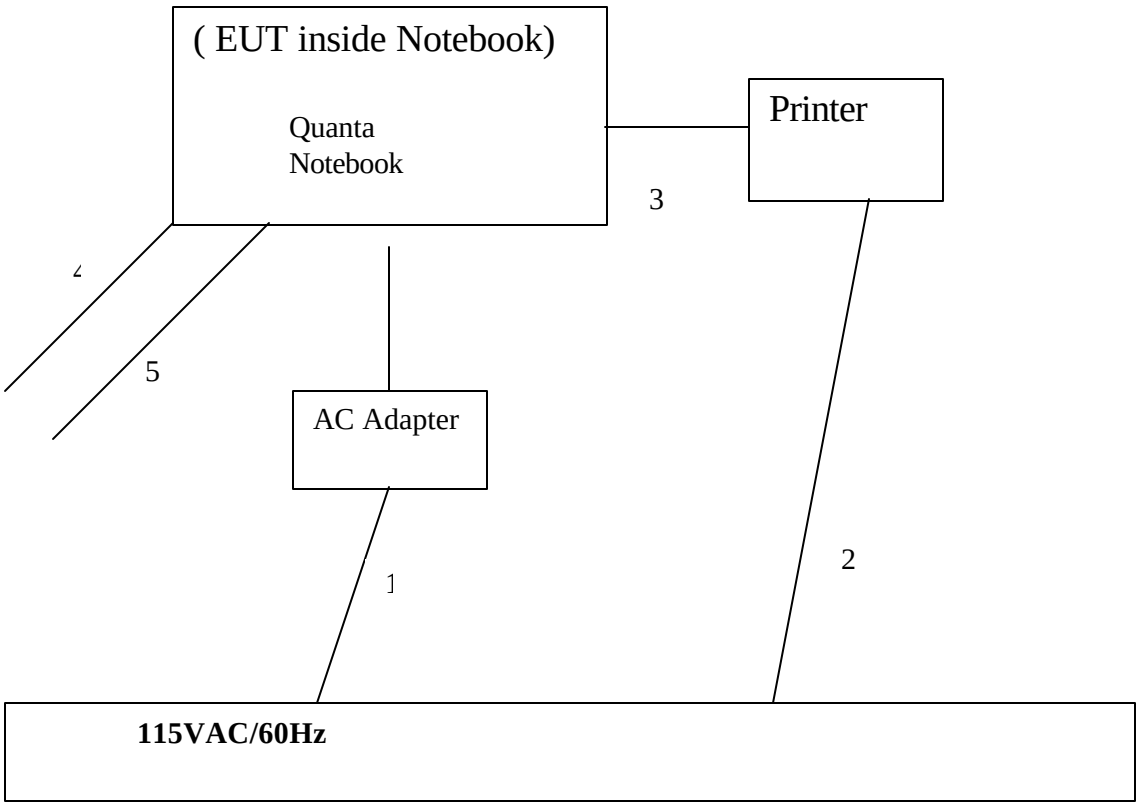
SUPPORT EQUIPMENT FOR TRANSMITTER TESTING

PERIPHERAL SUPPORT EQUIPMENT LIST				
Device Type	Manufacturer	Model	Serial Number	FCC ID
Laptop	Quanta Computer	ZGIS	QCHCP025000020	N/A
AC Adapter	Delta Electronic	ADP-75FB	NA	N/A

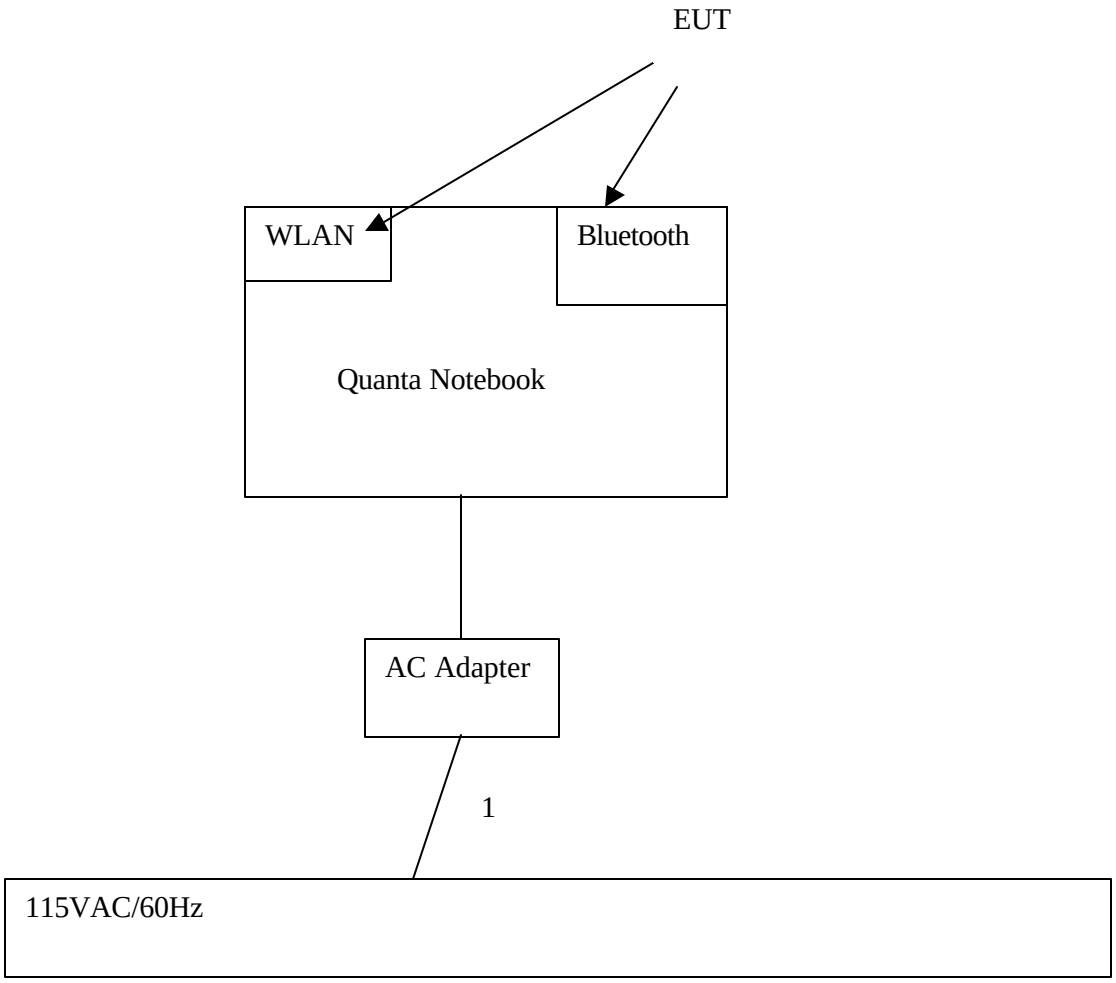
I/O CABLES

Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US115	Un-shielded	2 m	Integrated with AC Adapter, Bundled only for LC test

SETUP DIAGRAM FOR DIGITAL DEVICE TEST



SETUP DIAGRAM FOR TRANSMITTER TEST



7. APPLICABLE RULES

§15.247 (c)- SPURIOUS EMISSIONS

In addition, radiated emissions which fall in the restricted bands, as defined in§15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

§15.205- RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
[1]0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	([2])
13.36 - 13.41			

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.
[2] Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209- RADIATED EMISSION LIMITS

(a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 - 88	100 **	3
88 - 216	150 **	3
216 - 960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

(b) In the emission table above, the tighter limit applies at the band edges.

Frequency Range (MHz)	Field Strength (uV/m at 3 m)	Field Strength (dBuV/m at 3 m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

8. TEST SETUP, PROCEDURE AND RESULT

8.1. UNDESIRABLE EMISSIONS – RADIATED MEASUREMENTS

TEST SETUP

The EUT is placed on the wooden table. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.4/1992.

Both transmitters in the EUT are set to transmit simultaneously in a continuous mode.

TEST PROCEDURE

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For measurements above 1 GHz within restricted bands, the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 1 MHz for peak measurements and 10 Hz for average measurements.

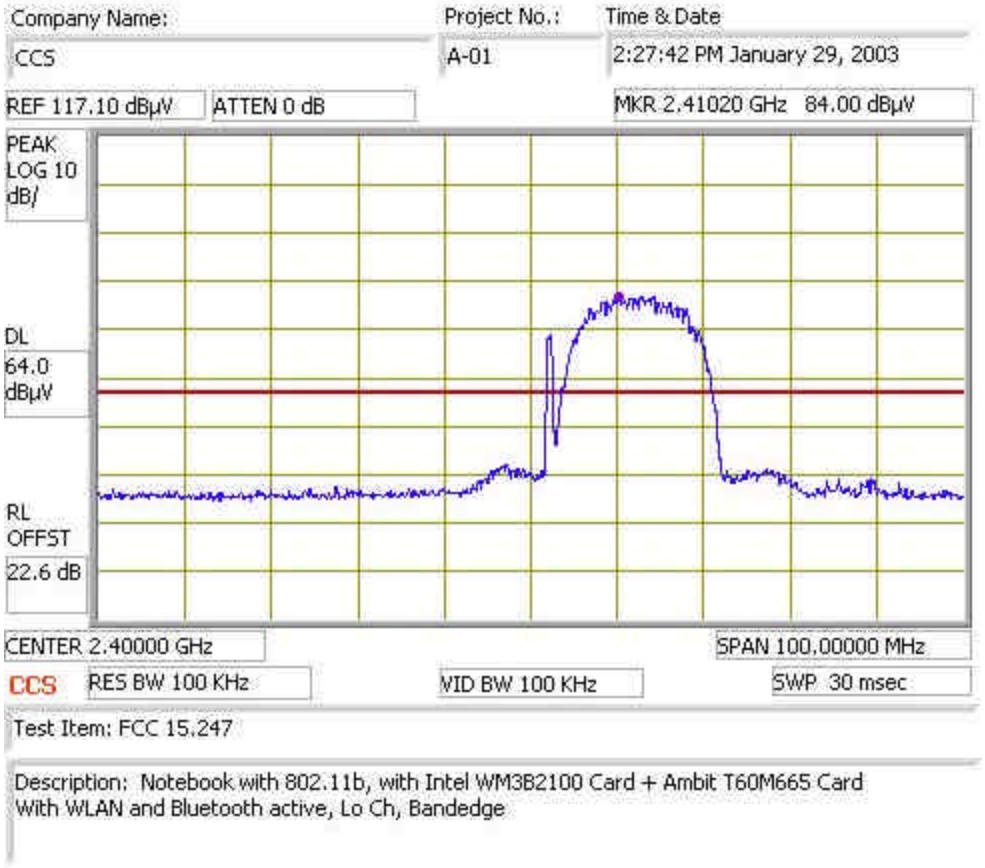
The spectrum from 30 MHz to 26 GHz is investigated.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The frequency span is set small enough to easily differentiate between broadcast stations, intermittent ambient signals and EUT emissions. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the suspected signal. Measurements were made with the antenna polarized in both the vertical and the horizontal positions.

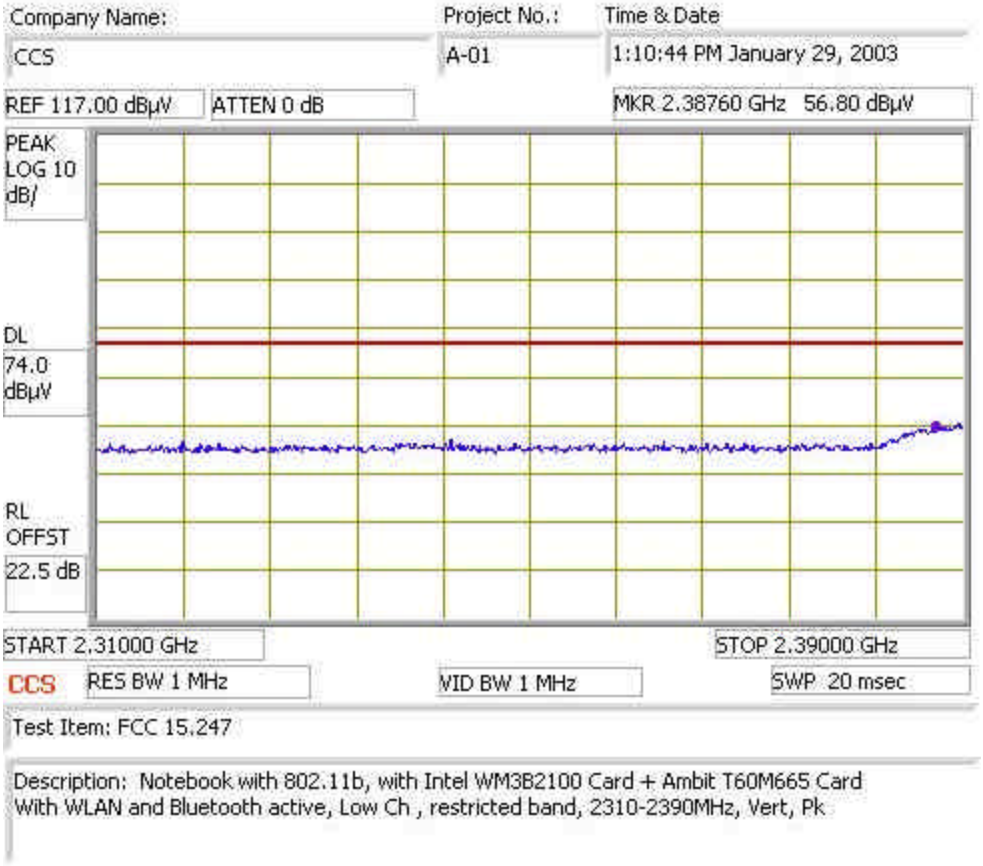
TEST RESULTS

Worst-case results are reported. No non-compliance noted:

LOWER BAND EDGE WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR LOW FREQUENCY CHANNELS



WORST CASE LOWER RESTRICTED BAND WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR LOW FREQUENCY CHANNELS – VERTICAL PEAK



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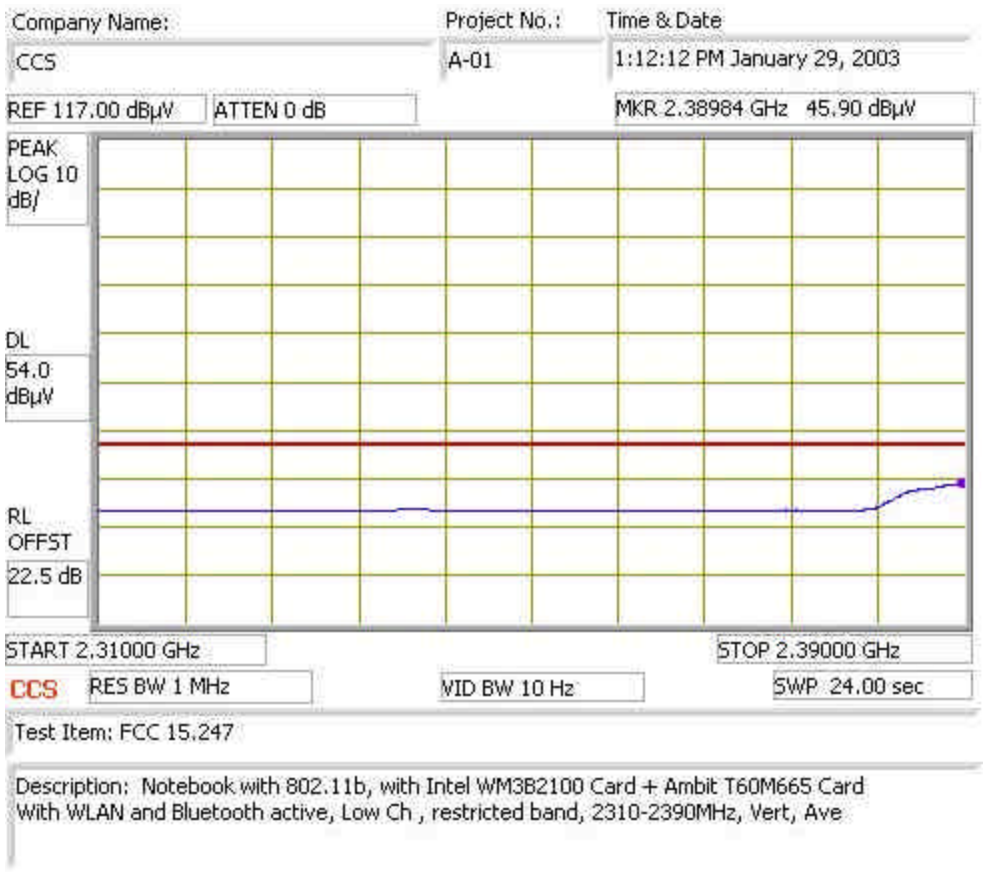

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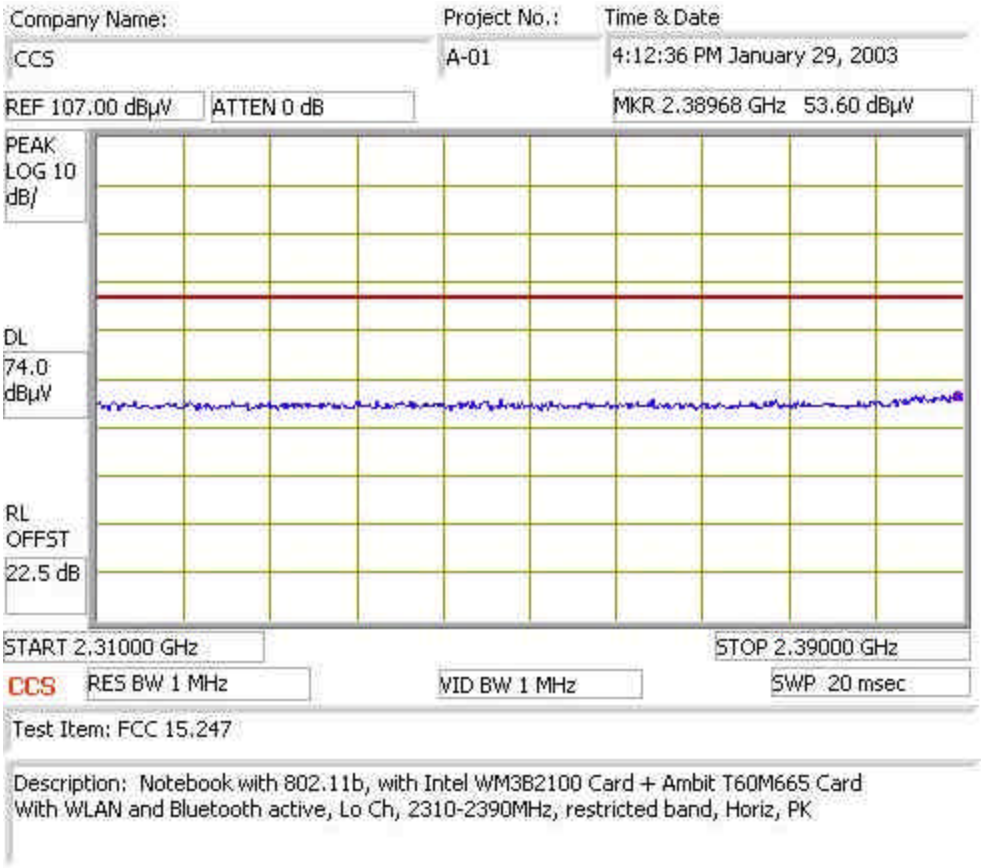
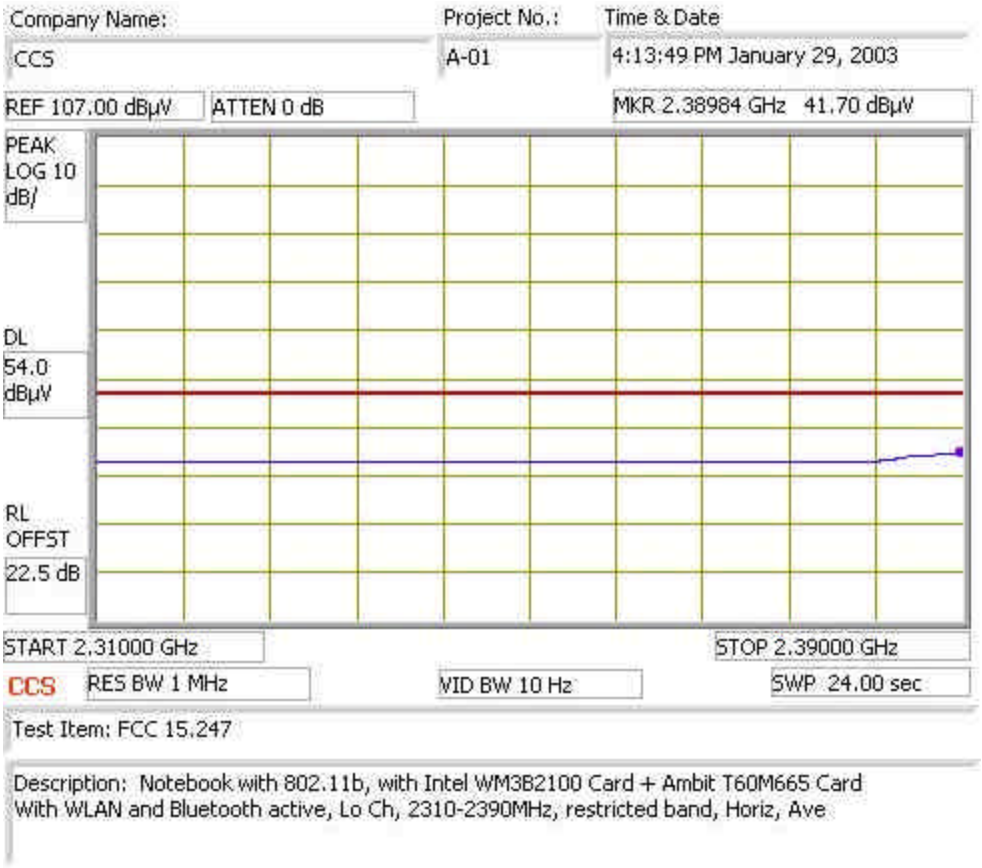
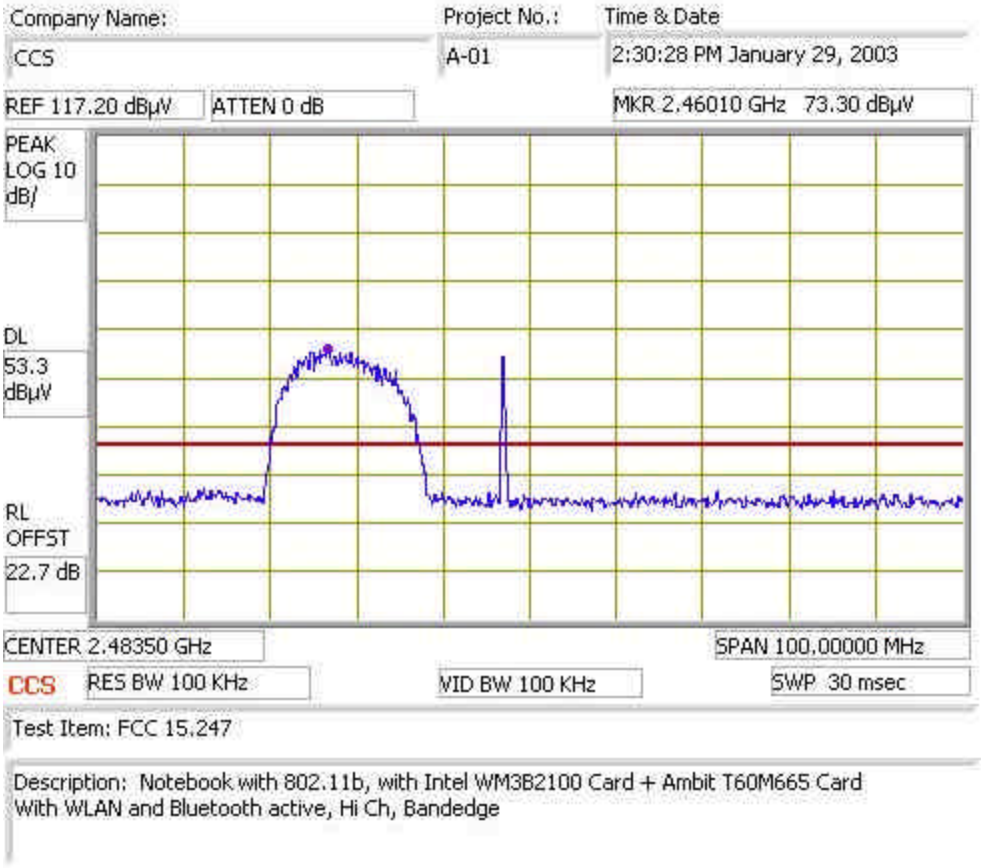


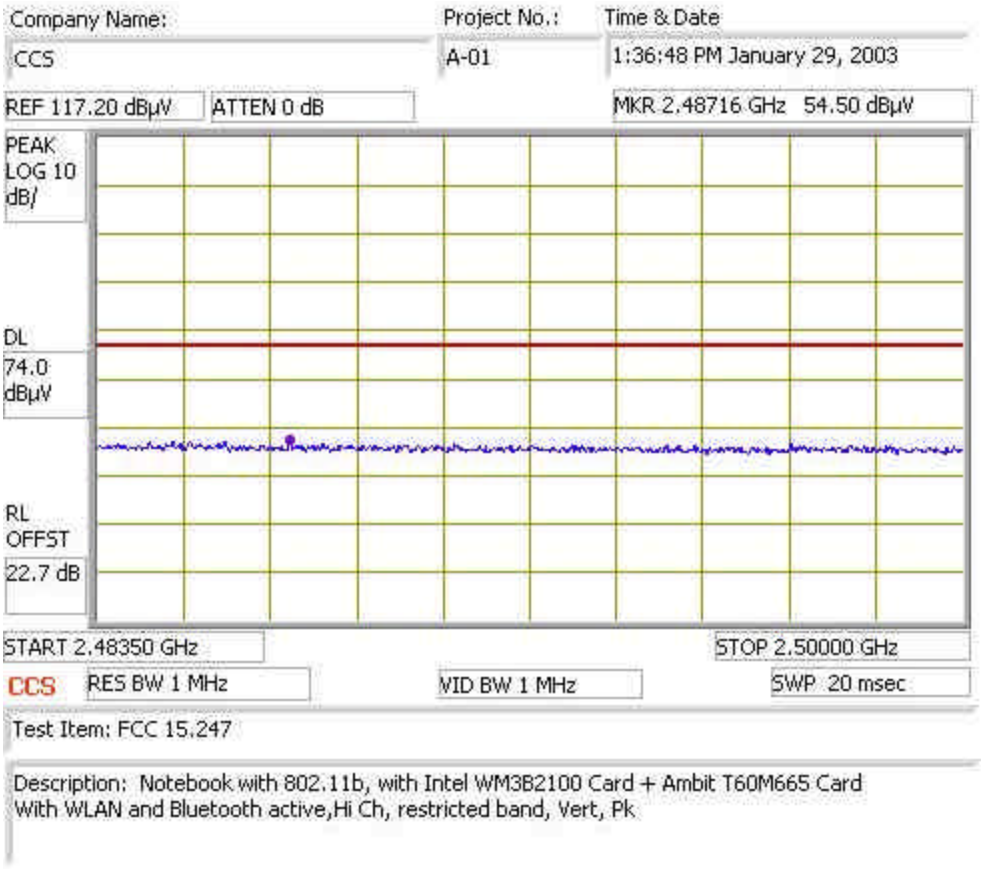
WORST CASE LOWER RESTRICTED BAND WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR LOW FREQUENCY CHANNELS – HORIZONTAL AVERAGE



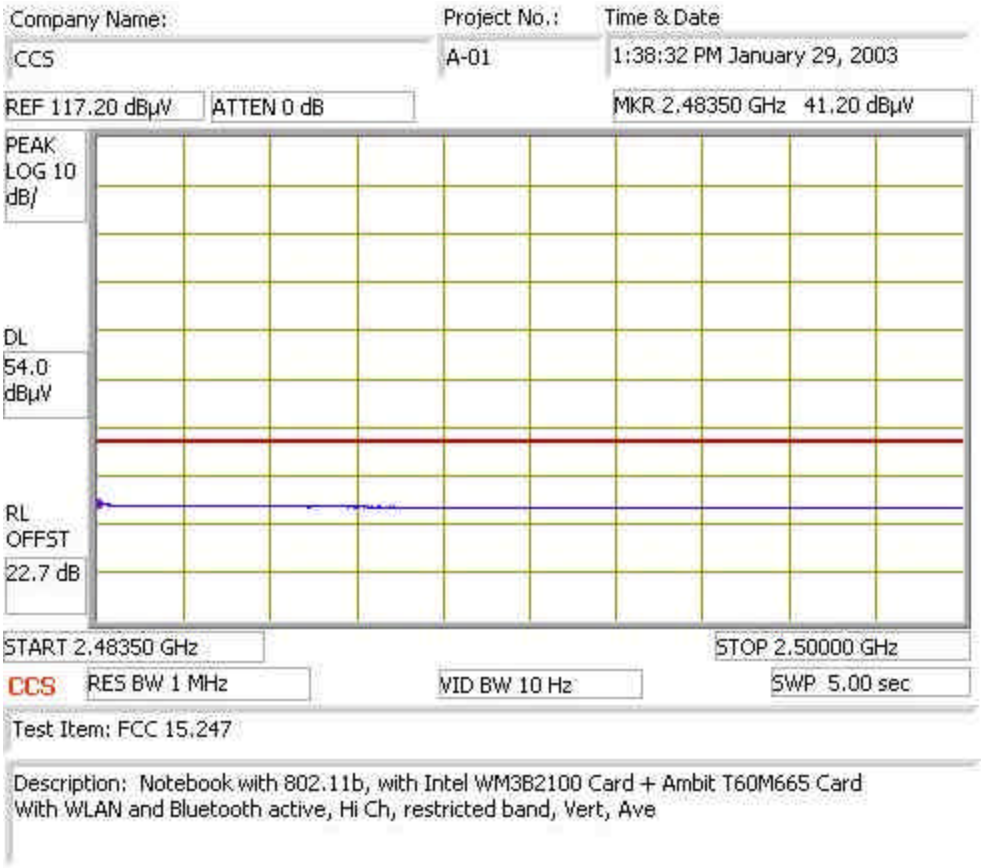
UPPER BAND EDGE WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR HIGH FREQUENCY CHANNELS



WORST CASE UPPER RESTRICTED BAND WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR HIGH FREQUENCY CHANNELS – VERTICAL PEAK

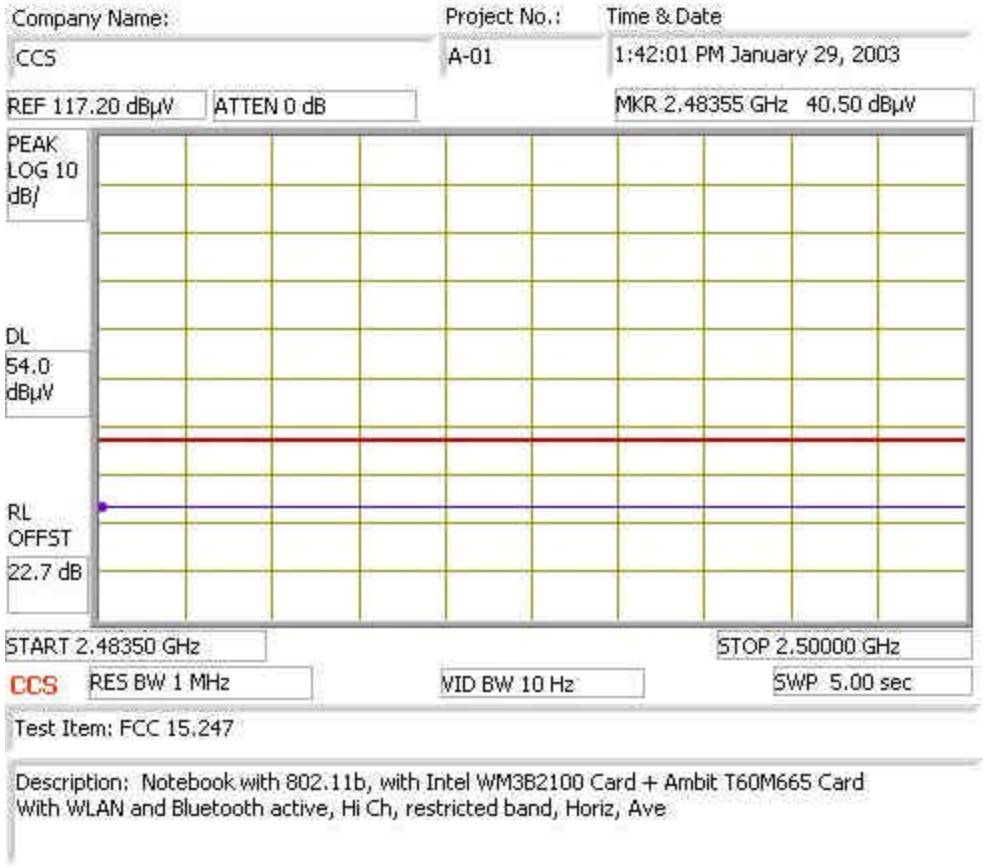


WORST CASE UPPER RESTRICTED BAND WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR HIGH FREQUENCY CHANNELS – VERTICAL AVERAGE



WORST CASE UPPER RESTRICTED BAND WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR HIGH FREQUENCY CHANNELS – HORIZONTAL PEAK

WORST CASE UPPER RESTRICTED BAND WITH CO-LOCATED BLUETOOTH AND WLAN OPERATING SIMULTANEOUSLY AT THEIR HIGH FREQUENCY CHANNELS – HORIZONTAL AVERAGE



WORST CASE HARMONICS AND SPURIOUS WITH CO-LOCATED BLUETOOTH AND WLAN

01/29/03 **High Frequency Measurement**
Compliance Certification Services, Morgan Hill Open Field Site

Test Engr: Chin Pang
Project #: 03T1782-1
Company: Quanta Computer Inc.
EUT Descrip.: Notebook with 802.11b mini PCI Card and Bluetooth modem
EUT M/N: ZGIS with intel WM3B2100 Card + Ambit T60M665 Card
Test Target: FCC 15.247
Mode Oper: Tx

Test Equipment:

Cable (feet)	EMCO Horn 1-18GHz	Pre-amplifer 1-26GHz	Spectrum Analyzer	Horn > 18GHz
12	T72; S/N: 6739	Miteq NSP2600-44	8566B Analyzer	

Peak Measurements:
1 MHz Resolution Bandwidth
1MHz Video Bandwidth

Average Measurements:
1 MHz Resolution Bandwidth
10Hz Video Bandwidth

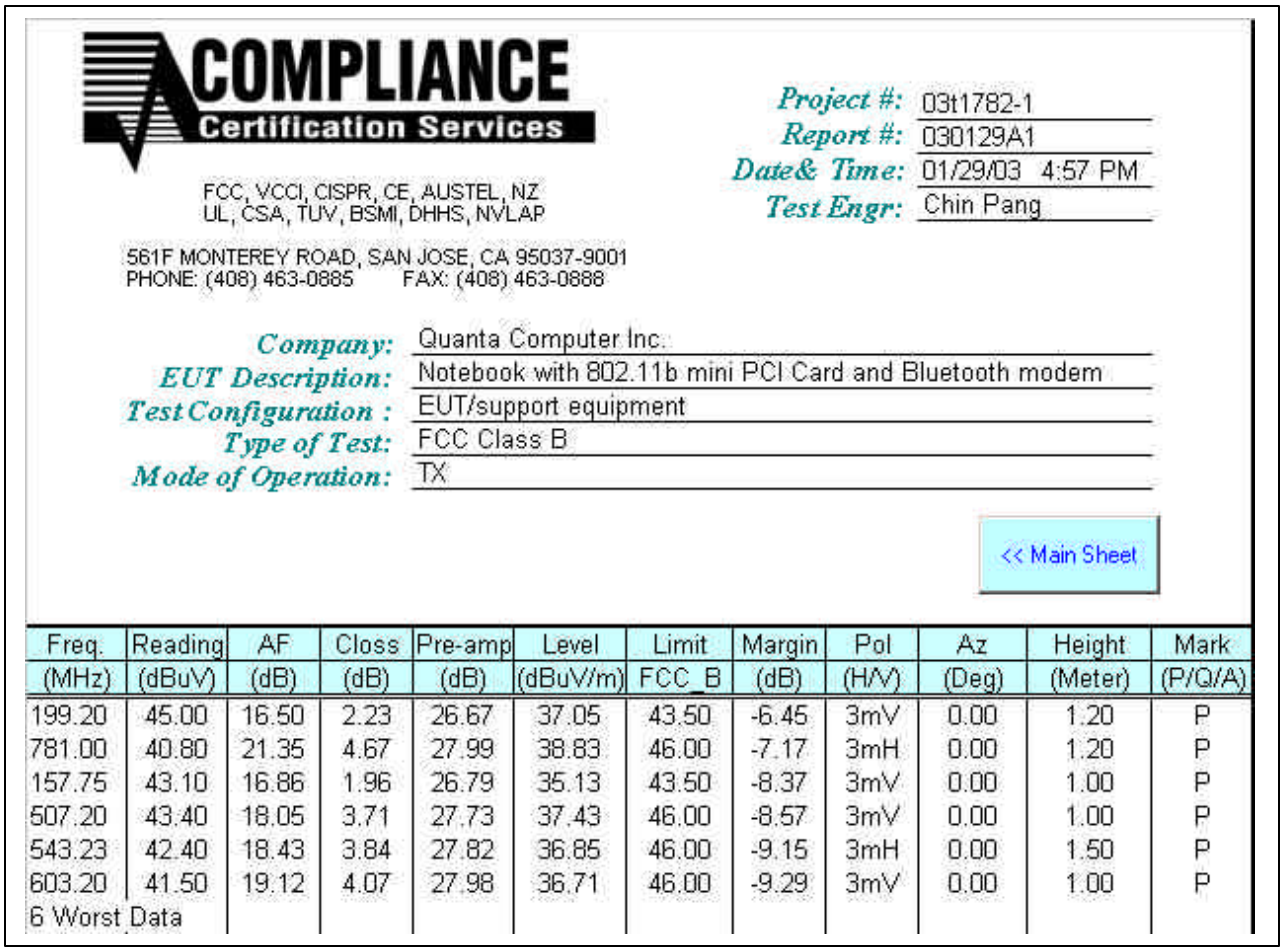
Mid Channel 2.437GHz

f GHz	Dist feet	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	HPF	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes
4.874	9.8	45.0	33.0	34.0	4.6	-36.1	0.0	1.0	48.5	36.5	74.0	54.0	-25.5	-17.5	V
4.874	9.8	45.1	33.0	34.0	4.6	-36.1	0.0	1.0	48.6	36.5	74.0	54.0	-25.4	-17.5	H
7.311	9.8	46.1	36.0	37.1	5.8	-36.3	0.0	1.0	53.7	43.6	74.0	54.0	-20.3	-10.4	V
7.311	9.8	47.6	35.9	37.1	5.8	-36.3	0.0	1.0	55.2	43.5	74.0	54.0	-18.8	-10.5	H
9.748	9.8	46.8	35.8	38.6	6.9	-35.5	0.0	1.0	57.7	46.8	74.0	54.0	-16.3	-7.2	V
9.748	9.8	46.5	35.7	38.6	6.9	-35.5	0.0	1.0	57.5	46.7	74.0	54.0	-16.5	-7.3	H
12.185	9.8	45.7	34.6	39.2	7.6	-36.4	0.0	1.0	57.2	46.1	74.0	54.0	-16.8	-7.9	V
12.185	9.8	45.3	34.5	39.2	7.6	-36.4	0.0	1.0	56.8	46.0	74.0	54.0	-17.2	-8.0	H

No other harmonics or spurious emissions detected above noise floor.

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

DIGITAL DEVICE RADIATED EMISSIONS



COMPLIANCE Certification Services

FCC, VCCI, CISPR, CE, AUSTEL, NZ
UL, CSA, TUV, BSMI, DHHS, NVLAP

561F MONTEREY ROAD, SAN JOSE, CA 95037-9001
PHONE: (408) 463-0885 FAX: (408) 463-0888

Project #: 03t1782-1
Report #: 030129A1
Date& Time: 01/29/03 4:57 PM
Test Engr: Chin Pang

Company: Quanta Computer Inc.
EUT Description: Notebook with 802.11b mini PCI Card and Bluetooth modem
Test Configuration : EUT/support equipment
Type of Test: FCC Class B
Mode of Operation: TX

<< Main Sheet

Freq. (MHz)	Reading (dBuV)	AF (dB)	Closs (dB)	Pre-amp (dB)	Level (dBuV/m)	Limit FCC_B	Margin (dB)	Pol (H/V)	Az (Deg)	Height (Meter)	Mark (P/Q/A)
199.20	45.00	16.50	2.23	26.67	37.05	43.50	-6.45	3mV	0.00	1.20	P
781.00	40.80	21.35	4.67	27.99	38.83	46.00	-7.17	3mH	0.00	1.20	P
157.75	43.10	16.86	1.96	26.79	35.13	43.50	-8.37	3mV	0.00	1.00	P
507.20	43.40	18.05	3.71	27.73	37.43	46.00	-8.57	3mV	0.00	1.00	P
543.23	42.40	18.43	3.84	27.82	36.85	46.00	-9.15	3mH	0.00	1.50	P
603.20	41.50	19.12	4.07	27.98	36.71	46.00	-9.29	3mV	0.00	1.00	P
6 Worst Data											

8.2. POWERLINE CONDUCTED EMISSIONS

TEST SETUP

The EUT is placed on a wooden table 40 cm from the vertical ground plane and 80 cm above the horizontal ground plane on the floor.

The EUT is set to transmit in a continuous mode.

TEST PROCEDURE

The resolution bandwidth is set to 10 kHz for both peak detection and quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Line conducted data is recorded for both NEUTRAL and HOT lines.

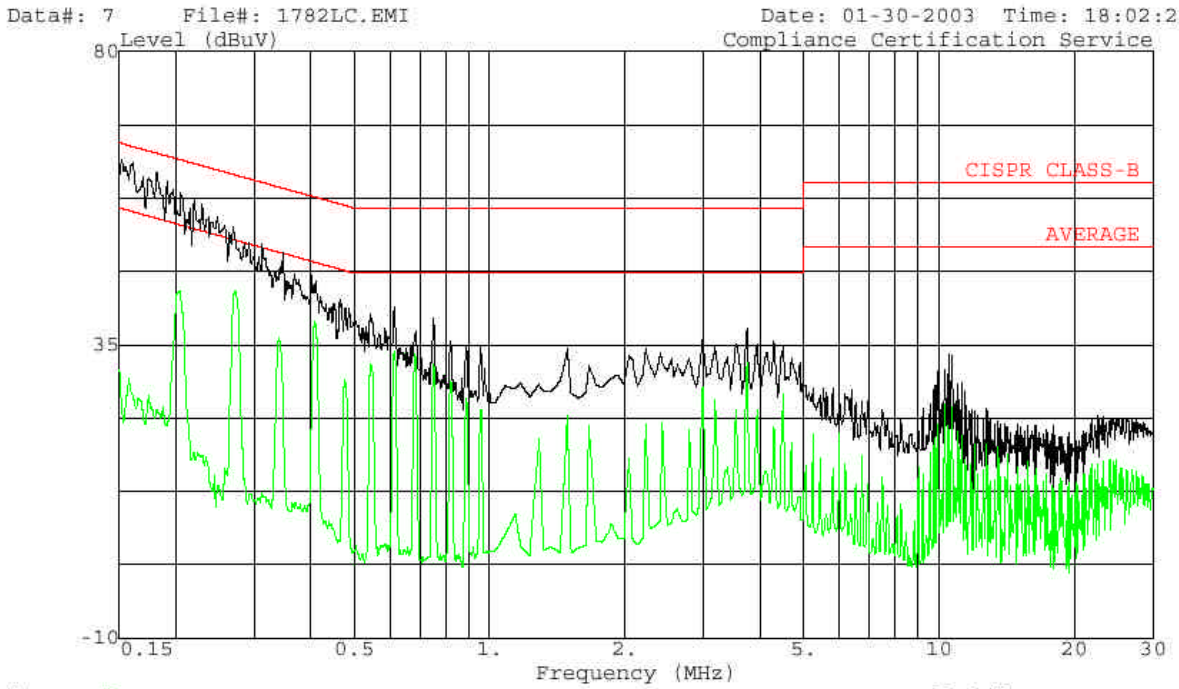
LINE CONDUCTION DATA

CONDUCTED EMISSIONS DATA (115VAC 60Hz)

Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.18	61.95	--	42.60	0.00	65.03	55.03	-3.08	-12.43	L1
0.23	56.56	--	42.72	0.00	63.74	53.74	-7.18	-11.02	L1
0.34	48.80	--	39.79	0.00	60.49	50.49	-11.69	-10.70	L1
0.16	62.29	--	40.05	0.00	65.66	55.66	-3.37	-15.61	L2
0.23	55.70	--	37.37	0.00	63.74	53.74	-8.04	-16.37	L2
0.35	45.90	--	33.91	0.00	60.23	50.23	-14.33	-16.32	L2
6 Worst Data									

LINE CONDUCTION PLOTS

COMPLIANCE Engineering Services, Inc.
561F Monterey Road,
San Jose, CA 95037 USA
Tel: (408) 463-0885
Fax: (408) 463-0888



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Project # : 03T1782-1
Test Engineer : Chin Pang
Company : Quanta Computer Inc.
EUT : Notebook with 802.11b mini PCI Card and
: Bluetooth Modem
Test Config. : EUT/Support Equipment
Model Name : ZGIS with Intel WM3B2100 + Ambit
: T60M665
Test of Target: CISPR22-B
Mode of Op. : TX
: 115VAC@60Hz
: L1: Peak (Black), Ave (Green)

COMPLIANCE Engineering Services, Inc.
561F Monterey Road,
San Jose, CA 95037 USA
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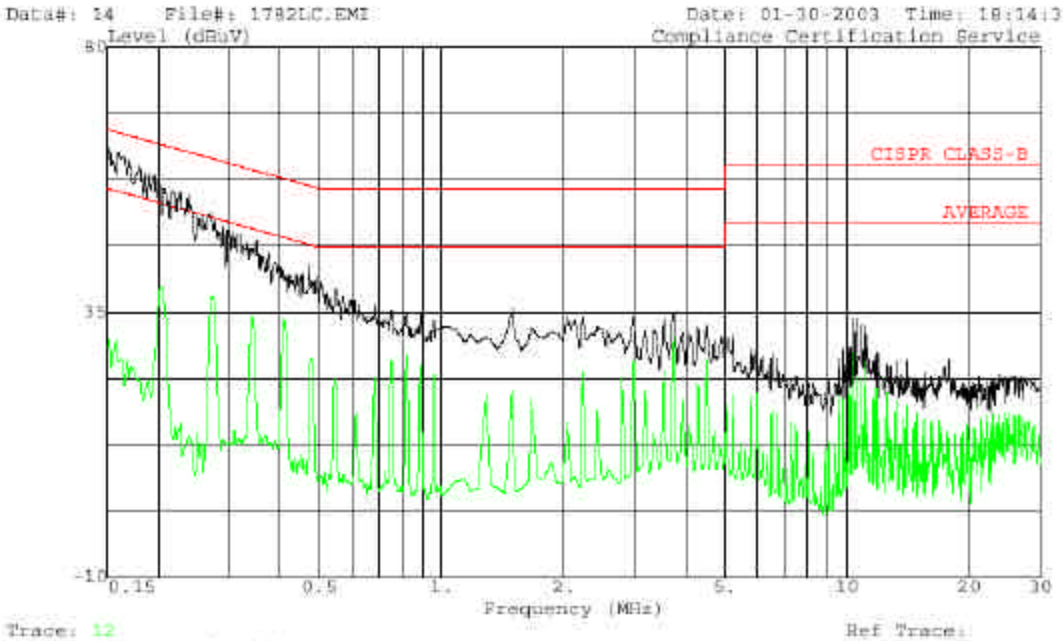
Fax: (408) 463-0888

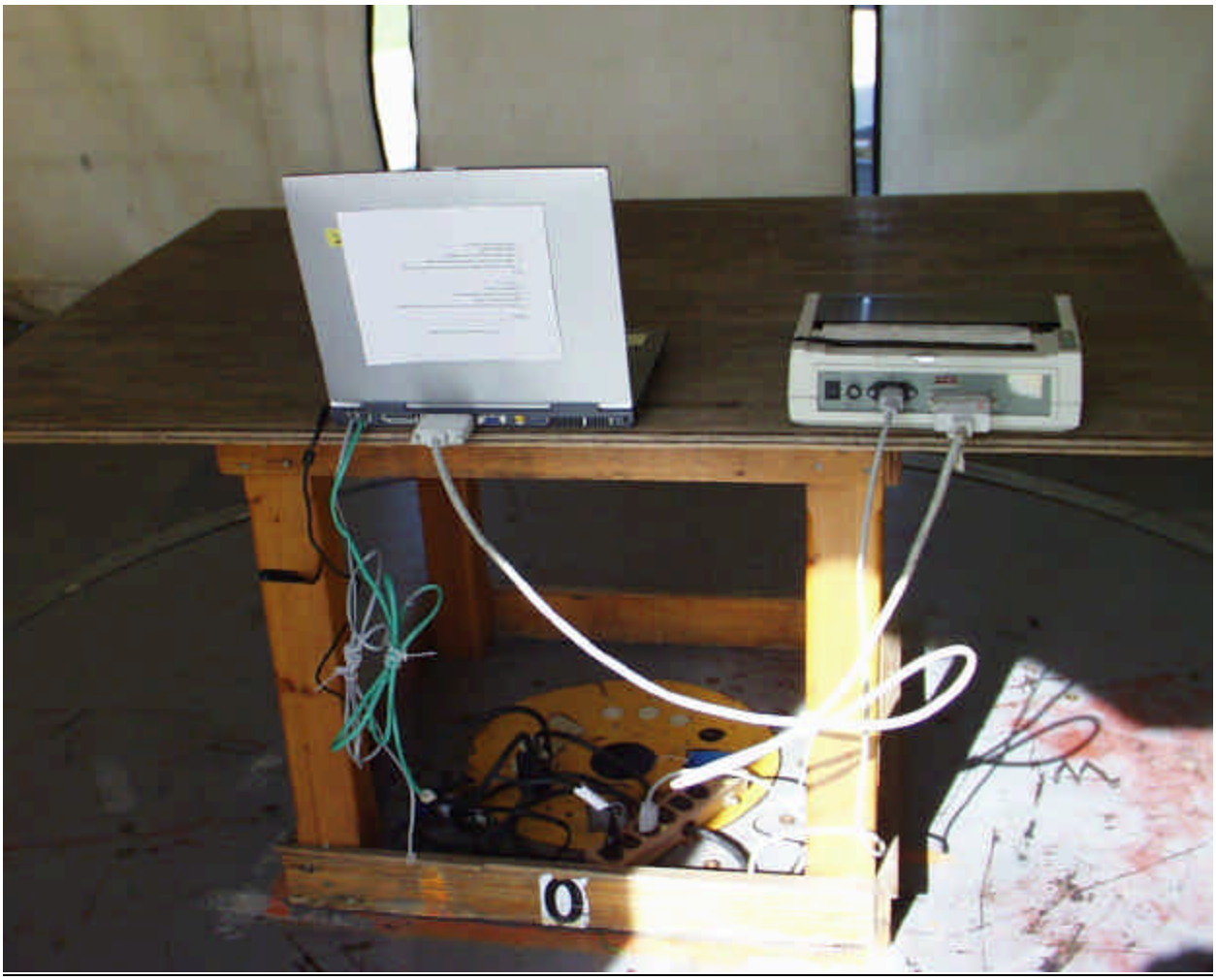


Trace: 12 Ref Trace:
Project # : 03T1782-1
Test Engineer : Chin Pang
Company : Quanta Computer Inc.
EUT : Notebook with 802.11b mini PCI Card and
: Bluetooth Modem
Test Config. : EUT/Support Equipment
Model Name : ZGIS with Intel WM3B2100 + Ambit
: T60M665
Test of Target: CISPR22-B
Mode of Op. : TX
: 115VAC@60Hz
: L2: Peak (Black , Ave (Green)

9. SETUP PHOTOS

SETUP PHOTOS FOR TRANSMITTER TESTING

SETUP PHOTOS FOR DIGITAL DEVICE TESTING



LINE CONDUCTION SETUP PHOTO

END OF REPORT